REMARKS

Claims 13-20 are cancelled herewith, leaving claims 1-12 currently pending in this application. All rejections are addressed insofar as they pertain to Claims 1-12.

Rejections under 35 U.S.C. §103

Claims 1 and 2 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,891,552 to Lu et al. in view of U.S. Patent No. 5,106,815 to Akada. Applicant respectfully traverses this rejection.

The present invention is directed to a painted metal sheet to which a full color design can be applied by transfer printing with a sublimation dye. According to the inventive process, the sublimation dye penetrates into the topcoat or clear coat layer along its thickness direction, and the surface of the topcoat or clear coat layer is substantially free from the sublimation dye. Consequently, the colored design does not fade away so much after the lapse of time, even under abrasive conditions, in comparison with a colored design formed by a conventional thermal printing process, whereby a dye is once melted and fused onto the surface of a topcoat layer.

In addition, the topcoat or clear coat layer is improved in anti-scratching property and wear resistance by dispersion of glass flakes and calcium silicate with specified particle sizes at predetermined ratios, as defined in claims 1 and 14 (Claim 14 now withdrawn) or by dispersion of powdery silica with specific particle size at a predetermined ratio, as defined in claims 7 and 15 (Claim 15 now withdrawn).

The specified sizes and ratios of glass flakes and calcium silicate are meaningful, as noted from experimental results in Table 3, compared with Table 4. Samples having particle sizes or amounts outside the ranges recited in Claim 1 were

inferior in at least one desired property such as adhesiveness, hardness, workability and the like (as more fully described in the specification at [79]. The specified sizes and ratios of powdery silica are also meaningful, as noted from experimental results in Table 8. As can be seen in Table 8, the comparative samples have sizes and amounts outside the ranges recited in Claim 7 were inferior in at least one property, as compared to the samples of the present invention. As explained in paragraphs [0046] to [0048] of the specification, the use of these particular amounts and sizes is useful for increasing the color concentration of the dye, in addition to improving wear resistance and anti-scratching properties.

The effects of such glass flakes and calcium silicate or of such powdery silica are not shown in any of the cited references. For example, the Lu patent (U.S. Patent No. 5,891,552 to Lu et al.) discloses a method of printing in which a dye image is transferred to the surface of a coating layer on a thermoplastic polyolefin substrate by a thermal printing process. Although the printable coating composition may contain silica (col. 4, line 19), calcium silicate (col. 4, line 61) and glass flake (col. 4, line 62), these fillers are incorporated in much higher amounts (between 20-80 wt%) to control the degree of transparency or opacity (col. 4, line 53). There is no teaching of specific particle sizes and amounts of calcium silicate and glass flakes suitable for improvement in anti-scratching property and wear resistance of an ink-absorbing material. Thus, one skilled in the art would find no guidance in Lu for selection of the proper amounts and particle sizes for improvement of these properties.

Akada, U.S. Patent No. 5,106,815, discloses that a material to be transferred may be a metal substrate coated with a dye-receptive layer (col. 15, lines 24-28), and the dye-receptive layer may contain finely divided silica (col. 15, lines 52-53). However, Akada does not teach particle size ranges and amounts of silica and glass

flakes in the dye-receptive layer which would be suitable for imparting the desired properties of hardness, etc., but only discloses that silica is effective for preventing adhesion of the transfer sheet to printed material (col. 15, lines 49-50). Thus, Akada does not provide the missing teaching in Lu, namely the particle sizes and amounts of calcium silicate and glass flakes which will provide the desired properties. Akada cannot be combined with Lu to render Claims 1 and 2 obvious.

Claims 3-6 stand rejected under 35 U.S.C. §103(a) as being unpatentable over either of Takeuchi et al. or Yoshida et al. taken with Akada and Kawai, U.S. Patent No. 5,977,022, and as being unpatentable over Lu in view of Akada and Kawai. Applicant respectfully traverses these bases of rejection. Claims 3-6 depend from Claim 1. None of the cited references, alone or in combination, teach the amounts and particle sizes of calcium silicate and glass flakes recited in Claim 1.

Takeuchi discloses the incorporation of inorganic particles in a thermal transfer layer or a heat-resistant slip layer of a thermal transfer sheet itself, but not in a material to which the image will be transferred. Although the dye-receptive layer is formed on a metal substrate (col. 16, lines 53-58), there are no teachings on incorporation of a combination of calcium silicate and glass flakes, of the size and amount recited in Claim 1.

Yoshida, also cited for its disclosure of a dye-receptive coating, does not disclose the combination of calcium silicate and glass flakes recited in Claim 1, nor the amounts and particle sizes of these in Claim 1.

Kawaii teaches an intermediate layer 24 interposed between a substrate 21 and a receptor layer 22, but there is no disclosure of incorporation of calcium silicate in combination with glass flakes. Thus, none of the cited references, alone or in combination, provide the missing teaching, namely the use of a combination of calcium

silicate and glass flakes in the amounts and particle sizes recited in Claim 1. Applicant respectfully submits that Claim 1, and the claims depending therefrom, are not obvious in view of any of these references.

Claim 7 stands rejected under 35 U.S.C. §103(a) as being unpatentable over either of U.S. Patent No. 6,265,345 to Takeuchi et al. or U.S. Patent No. 6,265345 to Yoshida et al. taken with Akada. Applicant respectfully traverses this rejection.

Takeuchi does not disclose the use of particulates, and powdery silica in particular, in a thermoset material which is receiving the image, only a material which is to be transferred. The proper particle size and amount of the additives to be dispersed in the dye-receptive layer is not disclosed in Takeuchi. Yoshida also does not disclose the particle size and amount of powdery silica recited in Claim 1. Akada teaches that silica is effective for prevention of a heat transfer sheet from adhesion onto a printed material (col. 15, lines 49-50), but does not refer to particle size or ratio of silica to be incorporated in the paint layer. In short, the effects of the specified silica on properties of a top coat or clear paint layer are not shown in any of the cited references. Applicant respectfully submits that Claim 7 is not obvious in view of the cited references.

Claim 8 stands rejected under 35 U.S.C. §103(a) as being unpatentable over either of Takeuchi et al. or Yoshida et al. taken with Akada and Lu et al. Applicant respectfully traverses this rejection as well. Claim 8 depends from Claim 7 and further recites the use of UV absorbing agents. For the reasons discussed above as to patentability of Claim 7, Applicant submits that Claim 8 is not obvious in view of the references cited, and requests withdrawal of this basis of rejection.

Based on the foregoing amendments and remarks, reconsideration of the rejections and allowance of pending claims 1-12 are respectfully requested.

Respectfully submitted,

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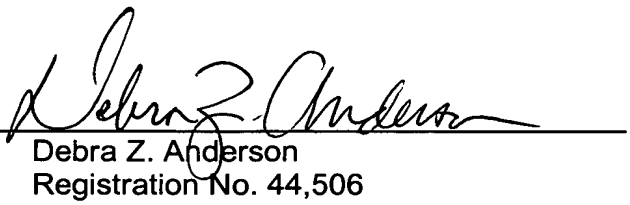
By 

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